X-rays, CT Scans and MRIs

Diagnostic imaging techniques help narrow the causes of an injury or illness and ensure that the diagnosis is accurate. These techniques include X-rays, computed tomography (CT) scans, magnetic resonance imaging (MRI).

These imaging tools let your doctor "see" inside your body to get a "picture" of your bones, organs, muscles, tendons, nerves, and cartilage. This is a way the doctor can determine if there are any abnormalities.

X-rays

X-rays (radiographs) are the most common and widely available diagnostic imaging technique. Even if you also need more sophisticated tests, you will probably get an X-ray first.

The part of your body being pictured is positioned between the X-ray machine and photographic film. You have to hold still while the machine briefly sends electromagnetic waves (radiation) through your body, exposing the film to reflect your internal structure. The level of radiation exposure from X-rays is not harmful, but your doctor will take special precautions if you are pregnant.

Bones, tumors and other dense matter appear white or light because they absorb the radiation. Less dense soft tissues and breaks in bone let radiation pass through, making these parts look darker on the X-ray film. Sometimes, to make certain organs stand out in the picture, you are asked given barium sulfate or a dye.

You will probably be X-rayed from several angles. If you have a fracture in one limb, your doctor may want a comparison X-ray of your uninjured limb. Your X-ray session will probably be finished in about 10 minutes. The images are ready quickly.

X-rays may not show as much detail as an image produced using newer, more powerful techniques.

Computed Tomography (CT)

Computed tomography (CT) is a modern imaging tool that combines X-rays with computer technology to produce a more detailed, cross-sectional image of your body. A CT scan lets your doctor see the size, shape, and position of structures that are deep inside your body, such as organs, tissues, or tumors. Tell your doctor if you are pregnant before undergoing a CT scan.

You lie as motionless as possible on a table that slides into the center of the cylinder-like CT scanner. The process is painless. An X-ray tube slowly rotates around you, taking many pictures from all directions. A computer combines the images to produce a clear, two-dimensional view on a television screen.

You may need a CT scan if you have a problem with a small, bony structure or if you have severe trauma to the brain, spinal cord, chest, abdomen, or pelvis. As with a regular X-ray, sometimes you may be given barium sulfate or a dye to make certain parts of your body show up better.

SHOUT
SHARE
IT

A CT scan costs more and takes more time than a regular X-ray, and it is not always available in small hospitals and rural areas.

Magnetic Resonance Imaging (MRI)

Magnetic resonance imaging (MRI) is another modern diagnostic imaging technique that produces cross-sectional images of your body. Unlike CT scans, MRI works without radiation. The MRI tool uses magnetic fields and a sophisticated computer to take high-resolution pictures of your bones and soft tissues. Tell your doctor if you have implants, metal clips, or other metal objects in your body before you undergo an MRI scan.

You lie as motionless as possible on a table that slides into the tube-shaped MRI scanner. The MRI creates a magnetic field around you and then pulses radio waves to the area of your body to be pictured. The radio waves cause your tissues to resonate.

A computer records the rate at which your body's various parts (tendons, ligaments, nerves, etc.) give off these vibrations, and translates the data into a detailed, two-dimensional picture. You will not feel any pain while undergoing an MRI, but the machine may be noisy.

An MRI may help your doctor to diagnose your torn knee ligaments and cartilage, torn rotator cuffs, herniated disks, hip and pelvic problems, and other problems. An MRI may take 30 to 90 minutes. It is not available at all hospitals.

Last reviewed: July 2007

AAOS does not endorse any treatments, procedures, products, or physicians referenced herein. This information is provided as an educational service and is not intended to serve as medical advice. Anyone seeking specific orthopaedic advice or assistance should consult his or her orthopaedic surgeon, or locate one in your area through the AAOS "Find an Orthopaedist" program on this website.

Copyright 2007 American Academy of Orthopaedic Surgeons

Related Topics

Glossary of Orthopaedic Diagnostic Tests (http://orthoinfo.aaos.org/topic.cfm?topic=A00272)

OrthoInfo
The American Academy of Orthopaedic Surgeons
9400 West Higgins Road
Rosemont, IL 60018
Phone: 847.823.7186
Email: orthoinfo@aaos.org